CLAIMS

1. A chemical conversion coating agent comprising:

at least one kind selected from the group consisting of zirconium, titanium and hafnium;

fluorine; and

a water-soluble epoxy compound containing an isocyanate group and/or a melamine group,

wherein a content of the at least one kind selected from the group consisting of zirconium, titanium and hafnium in the chemical conversion coating agent is 20 to 10000 ppm in terms of metal, and

a content of the water-soluble epoxy compound containing the isocyanate group and/or the melamine group in the chemical conversion coating agent is 5 to 5000 ppm as a concentration of solid matter.

2. A chemical conversion coating agent comprising:

at least one kind selected from the group consisting of zirconium, titanium and hafnium;

fluorine;

a water-soluble epoxy compound; and

a polyisocyanate compound and/or a melamine resin,

wherein a content of the at least one kind selected from the group consisting of zirconium, titanium and hafnium in the chemical conversion coating agent is 20 to 10000 ppm in terms of metal, and

a total amount of the water-soluble epoxy compound and the polyisocyanate compound and/or the melamine resin in the chemical conversion coating agent is 5 to 5000 ppm as a concentration of solid matter.

3. The chemical conversion coating agent according to claim 1 or 2,

wherein the water-soluble epoxy compound has an amino

group.

4. The chemical conversion coating agent according to any of Claims 1 to 3, containing

1 to 5000 ppm of at least one kind of a chemical conversion reaction accelerator selected from the group consisting of nitrite ions, nitro group-containing compounds, hydroxylamine sulfate, persulfate ions, sulfite ions, hyposulfite ions, peroxides, iron (III) ions, citric acid iron compounds, bromate ions, perchlorinate ions, chlorate ions, chlorite ions as well as ascorbic acid, citric acid, tartaric acid, malonic acid, succinic acid and salts thereof.

5. The chemical conversion coating agent according to any of Claims 1 to 4, containing

at least one kind selected from the group consisting of: at least one kind of metal ions (A) selected from the group consisting of zinc ions, magnesium ions, calcium ions, aluminum ions, manganese ions and iron ions; copper ions (B); and a silicon-containing compound (C).

6. The chemical conversion coating agent according to any of Claims 1 to 5,

wherein the silicon-containing compound (C) is at least one kind selected from the group consisting of silica, water-soluble silicate compounds, esters of silicic acid, alkyl silicates and silane coupling agents.

7. The chemical conversion coating agent according to any of Claims 1 to 6,

wherein a pH thereof is 1.5 to 6.5.

8. A surface-treated metal having

a chemical conversion coat formed by the chemical conversion coating agent according to any of Claims 1 to 7.

9. The surface-treated metal according to Claim 8, wherein the chemical conversion coat has a coat amount of 0.1 to 500 mg/m^2 in sum of a total amount of metals contained in the chemical conversion coating agent and carbon contained in the water-soluble epoxy compound.

10. The surface-treated metal according to claim 8 or 9, wherein a substance to be treated comprises an iron material, a zinc material and/or an aluminum material.